XMM-Newton CCF Release Note

XMM-CCF-REL-187

Effective Area of the EPIC-pn X-Ray Telescope (XRT3)

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March 18, 2005

1 CCF Components

Name of CCF	VALDATE	EVALDATE	Blocks Changed	CAL Version	XSCS Flag
XRT3_XAREAEF_0010	2000-01-13T00:00:00	–	ONAXISXAREAEF		NO

2 Changes

The effective area of the XRT3 X-Ray Telescope (used for the EPIC-pn) has been modified above the Au M absorption edge (2.2 keV). Changes with respect to the previous CCF issue (0009) are shown in Figure 1 and are up to $\sim 4\%$.

3 Scientific Impact of this Update

In spectral fitting, the telescope instrumental residuals at the Au edge will be reduced, resulting in improved fits in the energy range from ~ 2.2 up to ~ 4 keV. Examples of this are shown in the spectral analysis of two pn Timing Mode observations, Figures 2 and 3, but the improvements affect all EPIC-pn observing modes.

4 Estimated Scientific Quality

The changes are based on analysis of pn Timing Mode observations of two bright continuum sources, the blazars Mkn 421 and PKS 2155-304. The high statistical significance of the data allowed the described adjustment of the telescope effective area to reduce the residuals.

5 Test Procedures

Functional testing with `calview` and `arfgen`. The data and the scientific validation of the PKS 2155-304 and Mkn 421 observations were kindly provided by F. Haberl (MPE).

6 Summary of the Test Results

Correct functionality; differences with respect to the previous issue as intended. For scientific test results, see Sections 3 and 4.

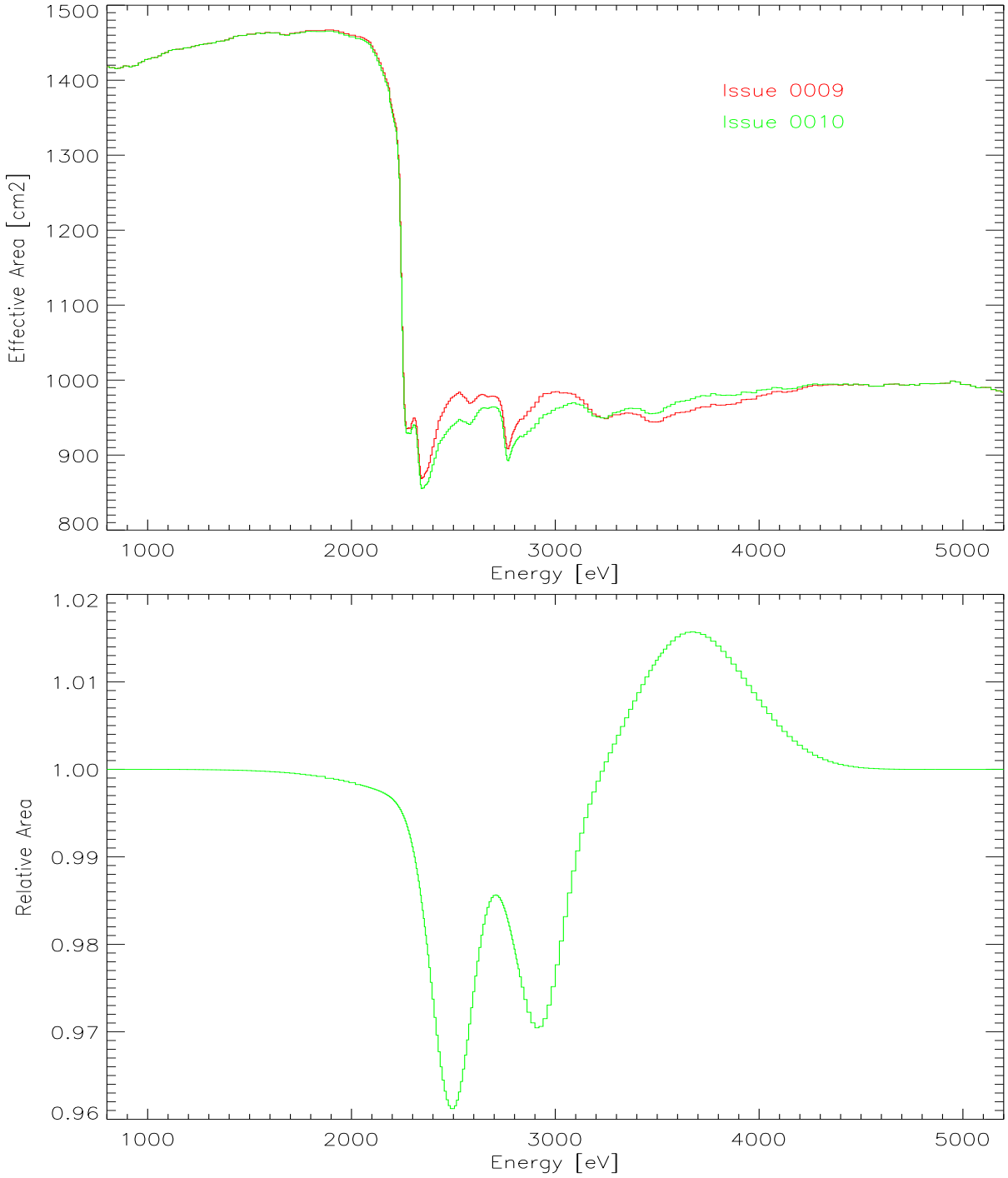

Figure 1: Comparison of the XRT3 effective area *vs* energy around the Au M absorption edges. Top: effective areas of CCF issues 0009 (red) and 0010 (green). Bottom: relative effective area of CCF issue 0010 with respect issue 0009.

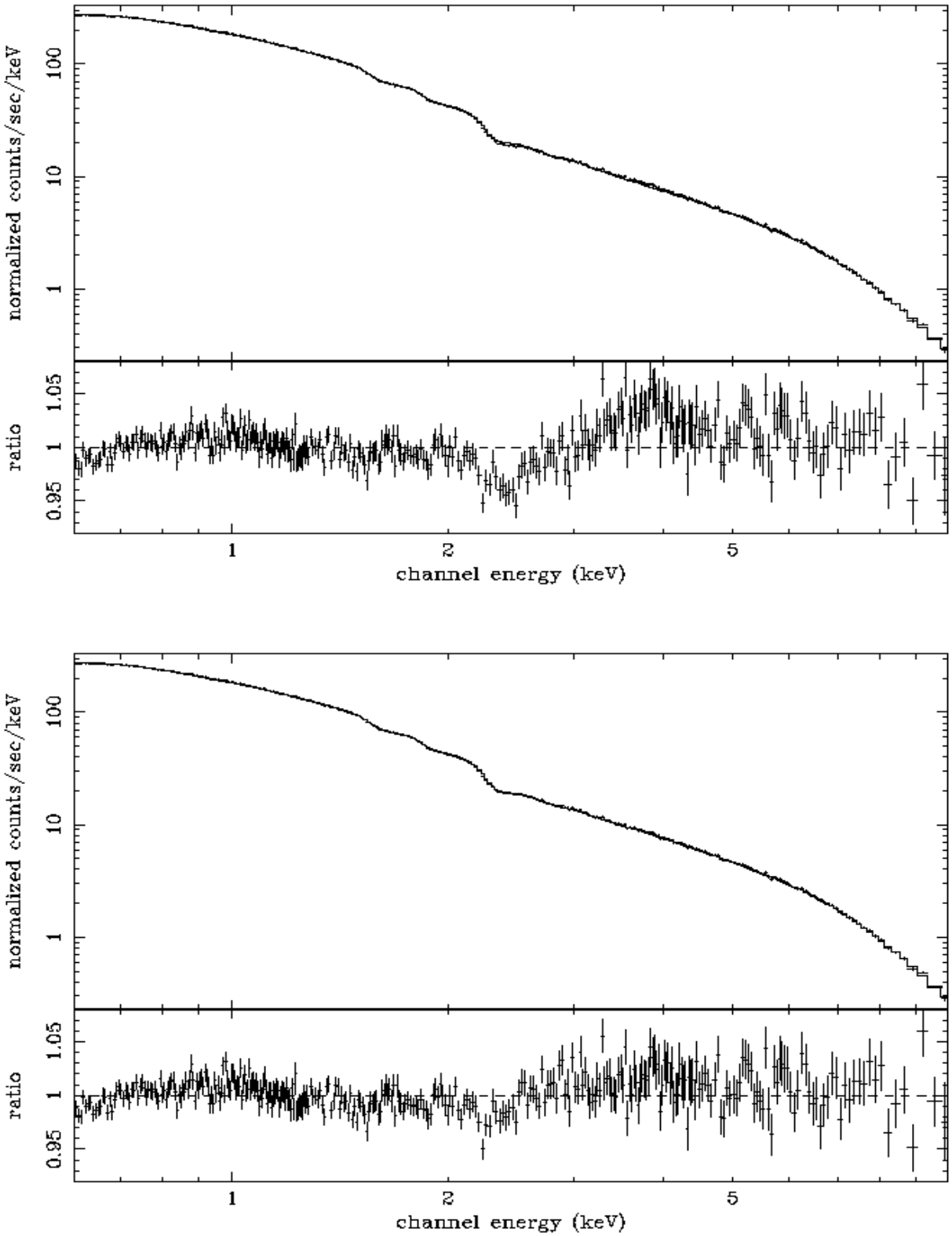

Figure 2: Mkn 421 (observation 0099280101, pn, Thick Filter, Timing Mode) spectral fit results using the issue 0009 (top) and 0010 (bottom) XRT3 effective areas. There is a clear reduction of residuals with respect to a broken powerlaw model above the Au edge up to about 4 keV.

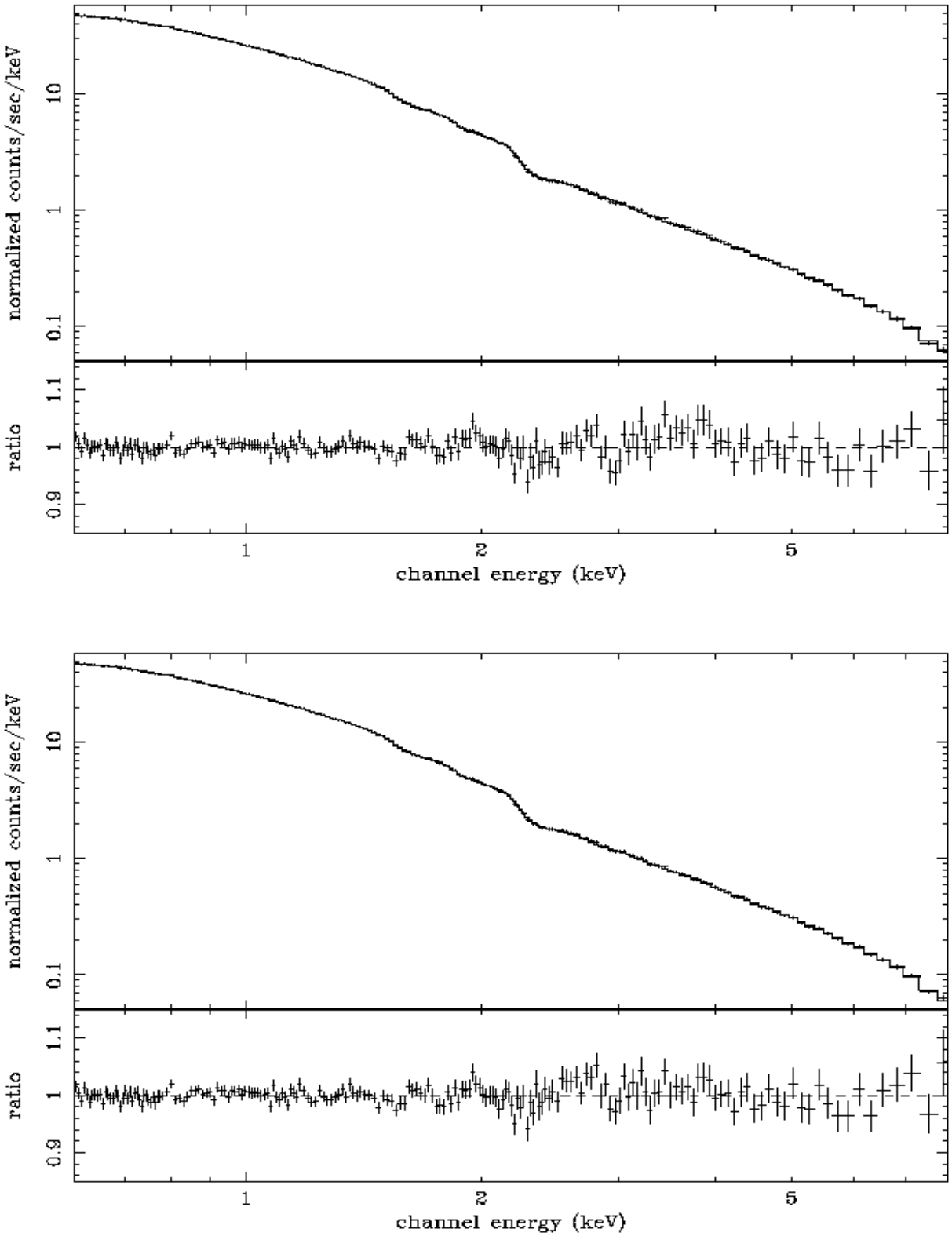

Figure 3: PKS 2155-304 (observation 0124930601, pn, Thick Filter, Timing Mode) spectral fit results using the issue 0009 (top) and 0010 (bottom) XRT3 effective areas. The fit is improved at and above the Au edge.